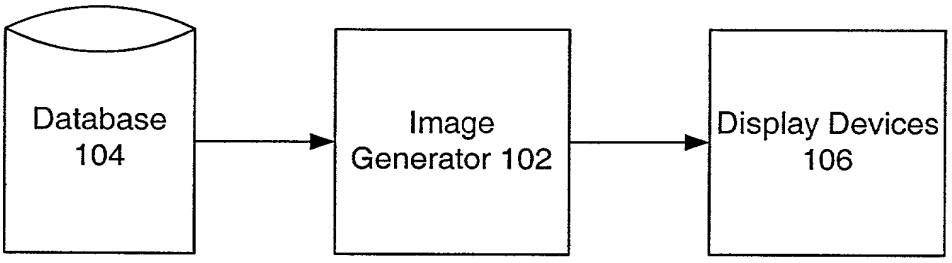
Database
104
Image
Generator 102
Display Devices
106

FIG. 1

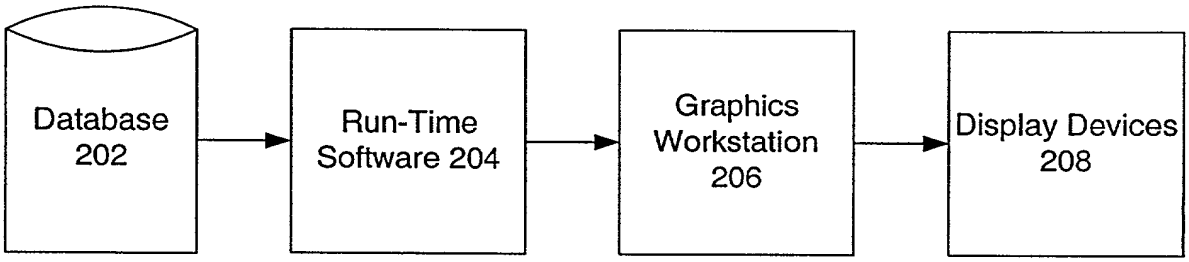
Database
202
Run-Time
Software 204
Graphics
Workstation
206
Display Devices
208

FIG. 2

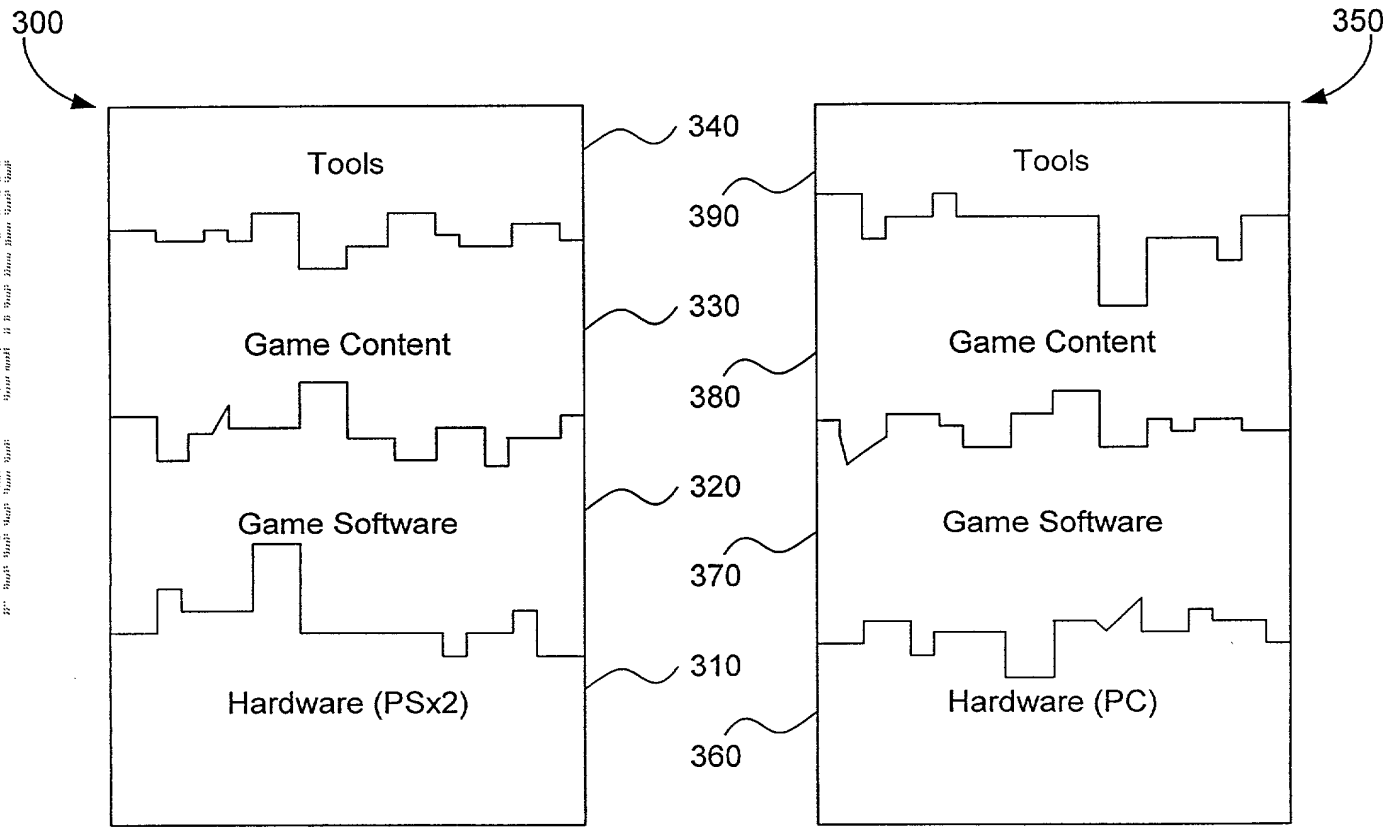
300
350
Tools
Game Content
Game Software
Hardware (PSx2)
340
390
330
380
320
370
310
360
Tools
Game Content
Game Software
Hardware (PC)

FIG. 3A

FIG. 3B

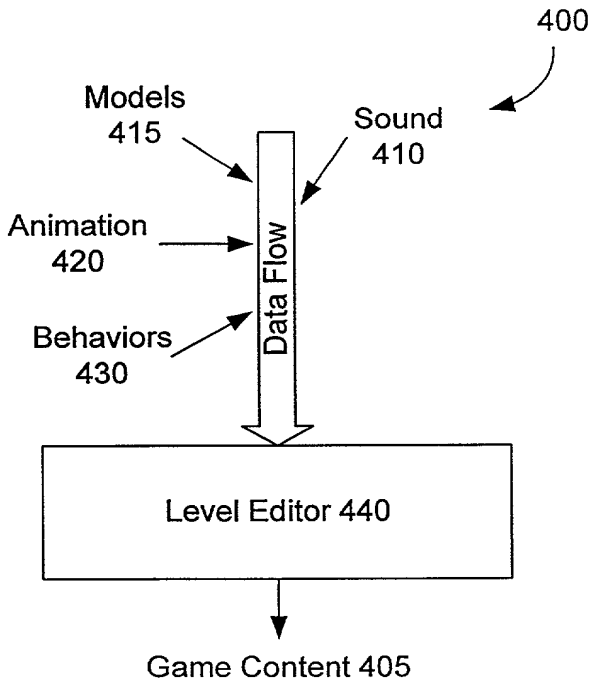
400
Models
415
Sound
410
Animation
420
Behaviors
430
Data Flow
Level Editor 440
Game Content 405

FIG. 4

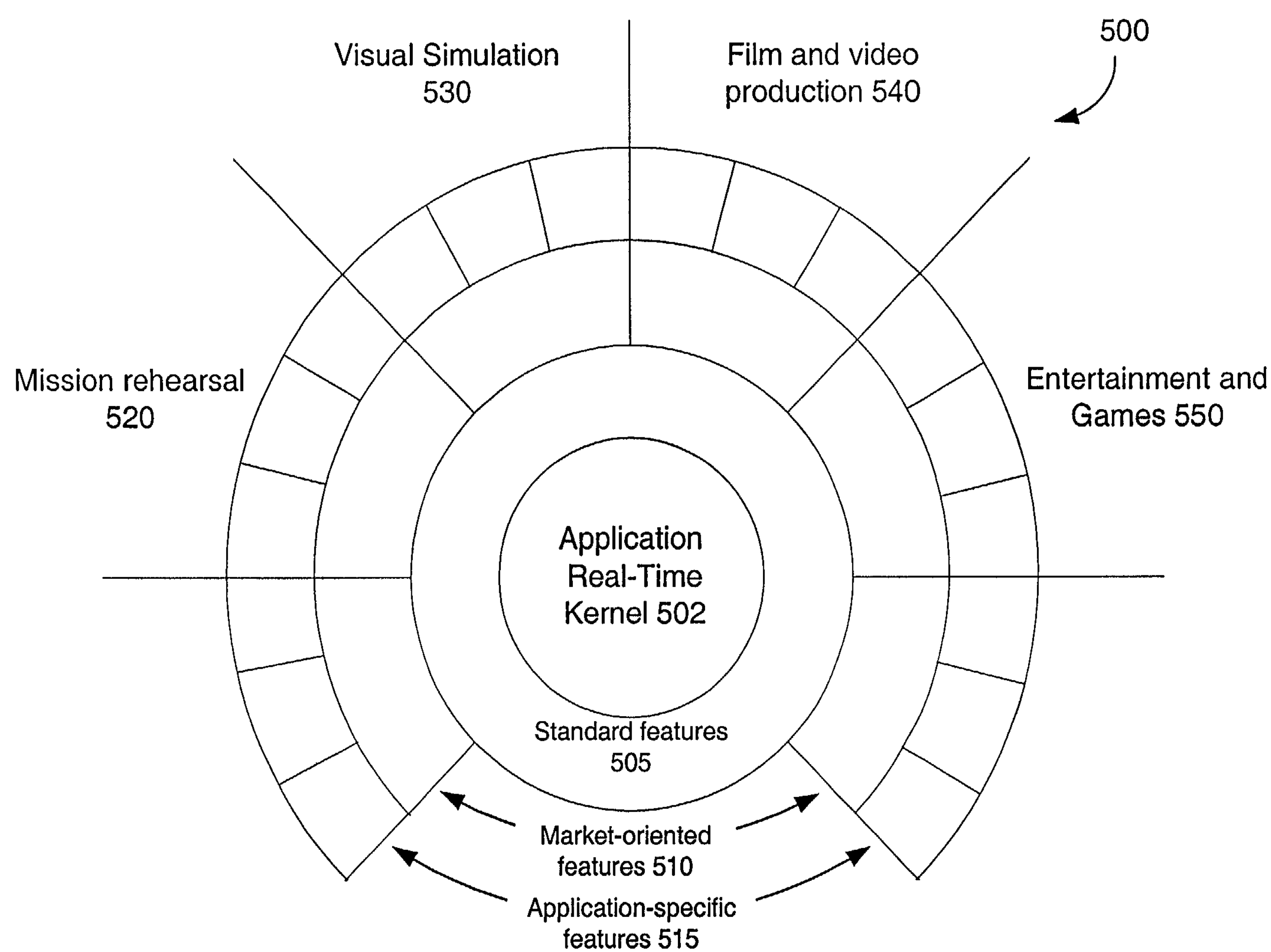
500
Visual Simulation
530
Film and video
production 540
Mission rehearsal
520
Entertainment and
Games 550
Application
Real-Time
Kernel 502
Standard features
505
Market-oriented
features 510
Application-specific
features 515

FIG. 5

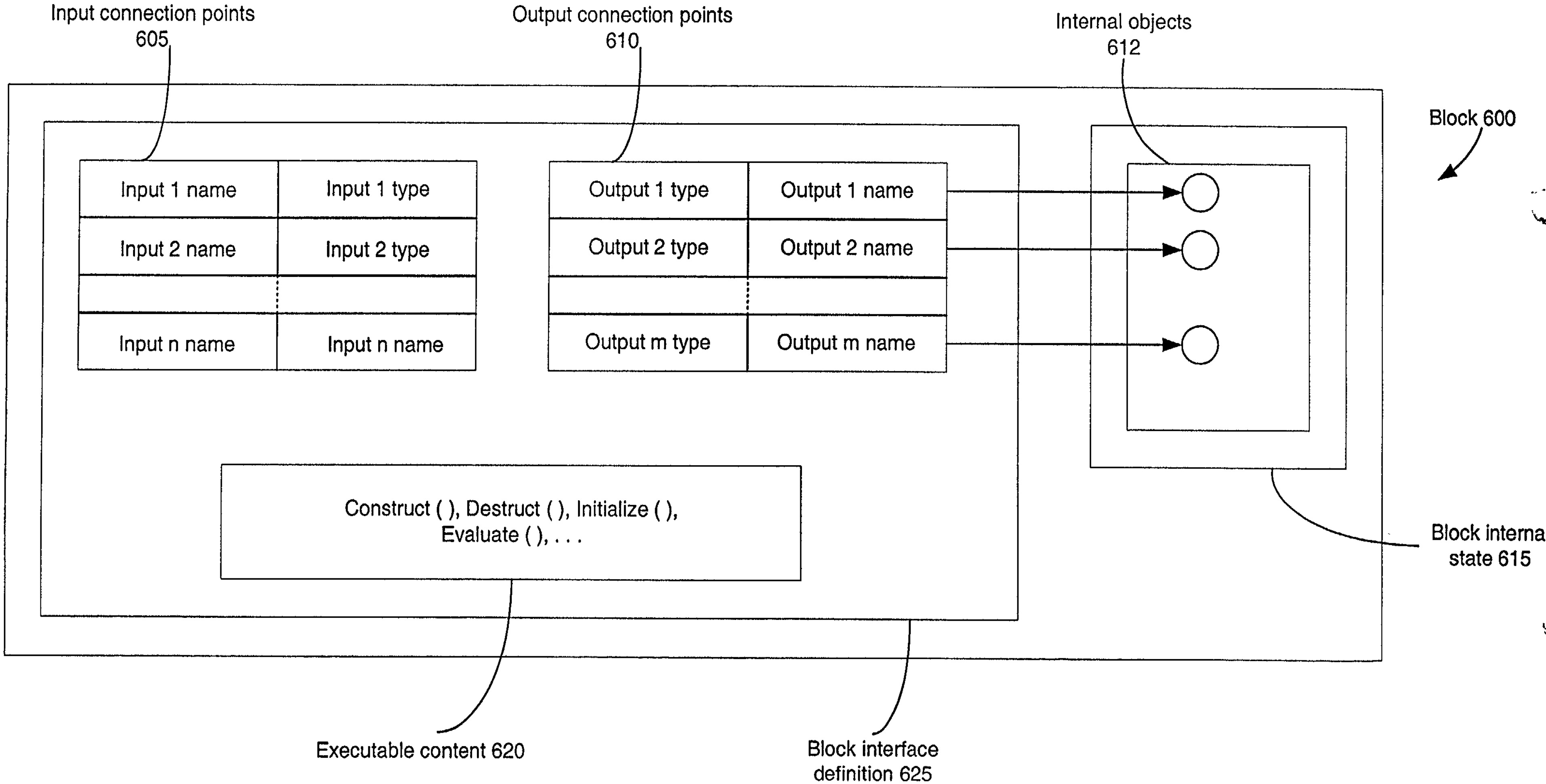
Input connection points
605
Output connection points
610
Internal objects
612
Block 600
Input 1 name
Input 1 type
Input 2 name
Input 2 type
Input n name
Input n name
Output 1 type
Output 1 name
Output 2 type
Output 2 name
Output m type
Output m name
Construct ( ), Destruct ( ), Initialize ( ),
Evaluate ( ), . . .
Block internal
state 615
Executable content 620
Block interface
definition 625

FIG. 6

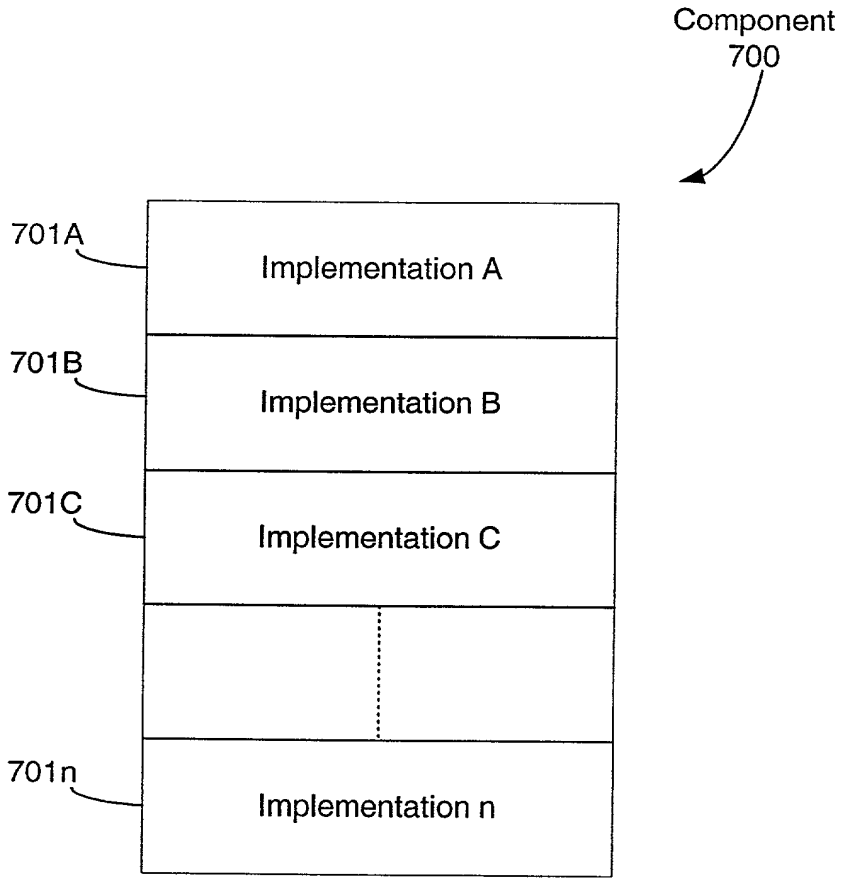
Component
700
701A
Implementation A
701B
Implementation B
701C
Implementation C
701n
Implementation n

FIG. 7

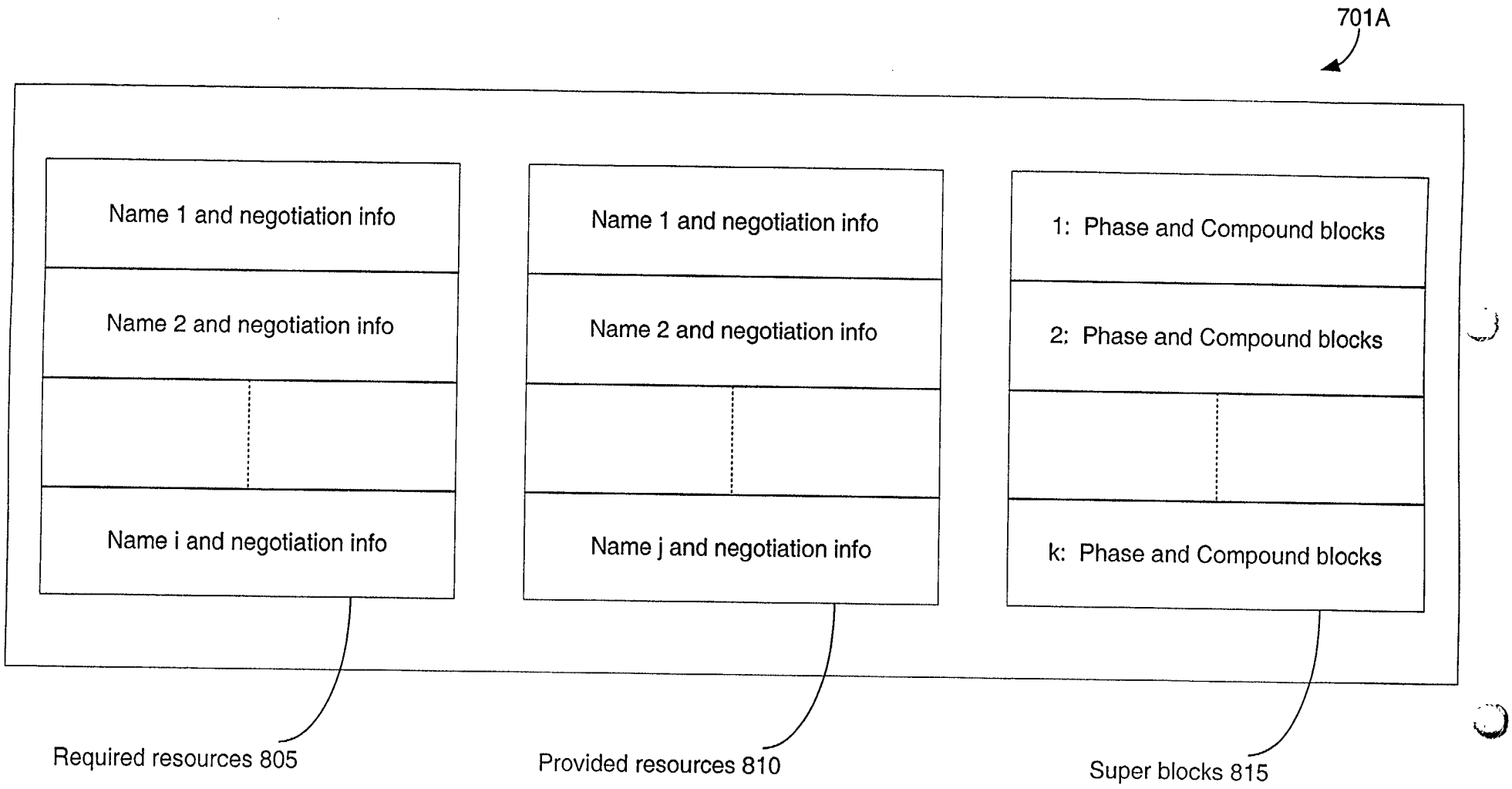
701A
Name 1 and negotiation info
Name 2 and negotiation info
Name i and negotiation info
Name 1 and negotiation info
Name 2 and negotiation info
Name j and negotiation info
1: Phase and Compound blocks
2: Phase and Compound blocks
k: Phase and Compound blocks
Required resources 805
Provided resources 810
Super blocks 815

FIG. 8

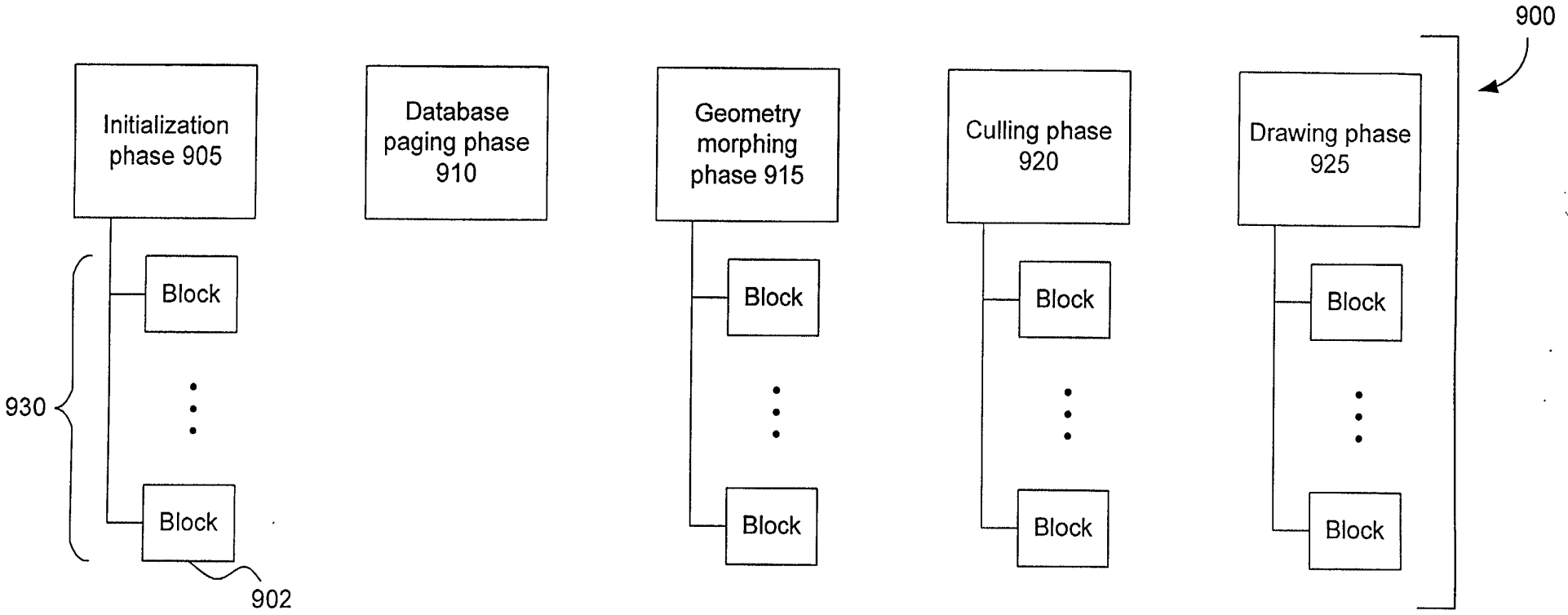
900
Initialization phase 905
Database paging phase 910
Geometry morphing phase 915
Culling phase 920
Drawing phase 925
Block
Block
Block
Block
Block
Block
Block
930
902

FIG. 9

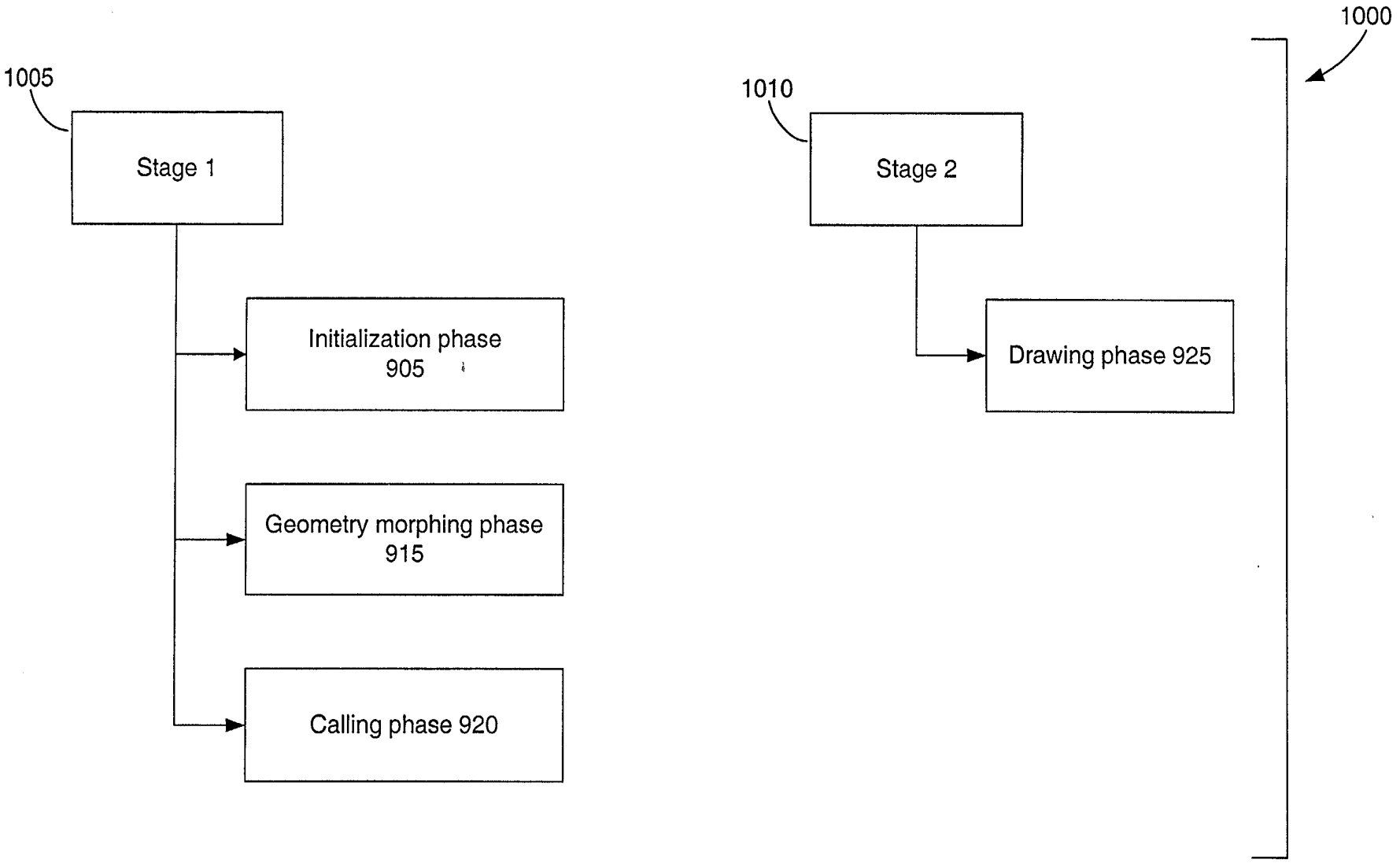
1000
1005
Stage 1
Initialization phase 905
Geometry morphing phase 915
Calling phase 920
1010
Stage 2
Drawing phase 925

FIG. 10

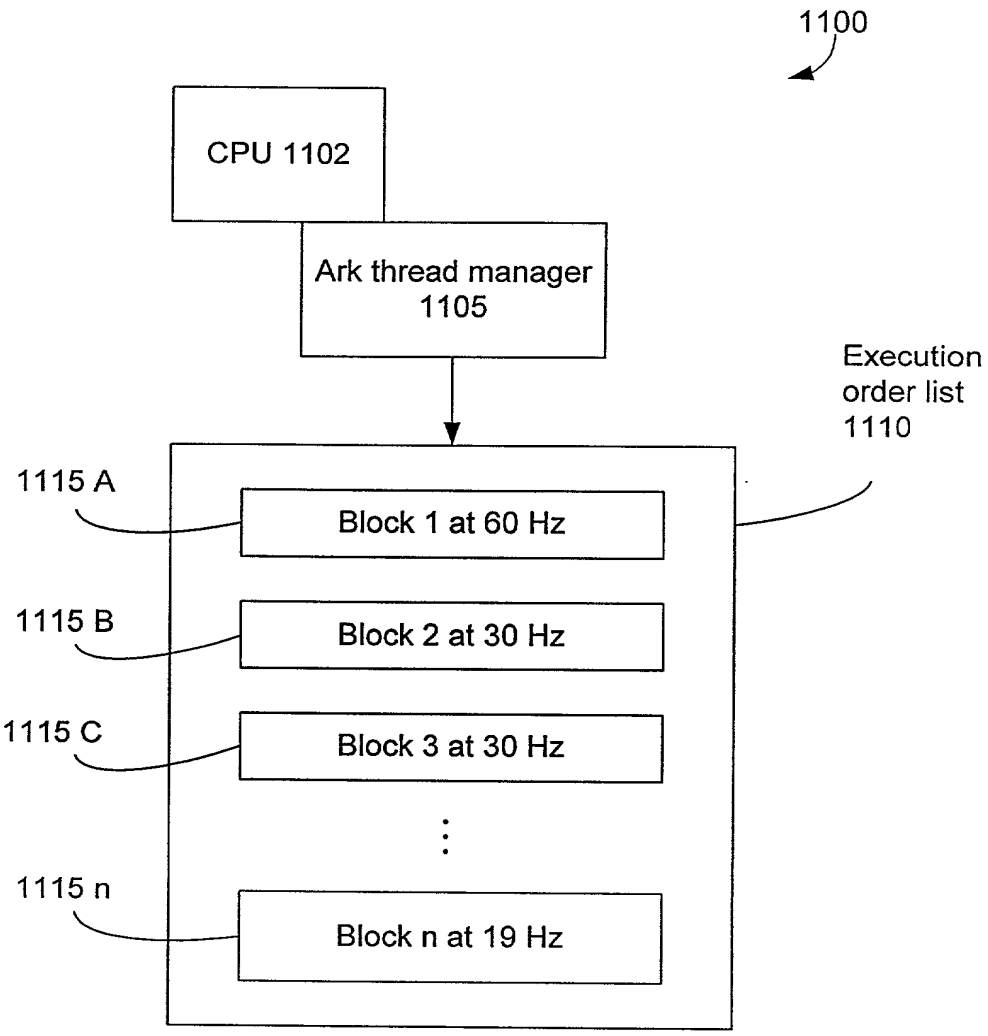
1100
CPU 1102
Ark thread manager 1105
Execution order list 1110
1115 A
Block 1 at 60 Hz
1115 B
Block 2 at 30 Hz
1115 C
Block 3 at 30 Hz
1115 n
Block n at 19 Hz

FIG. 11

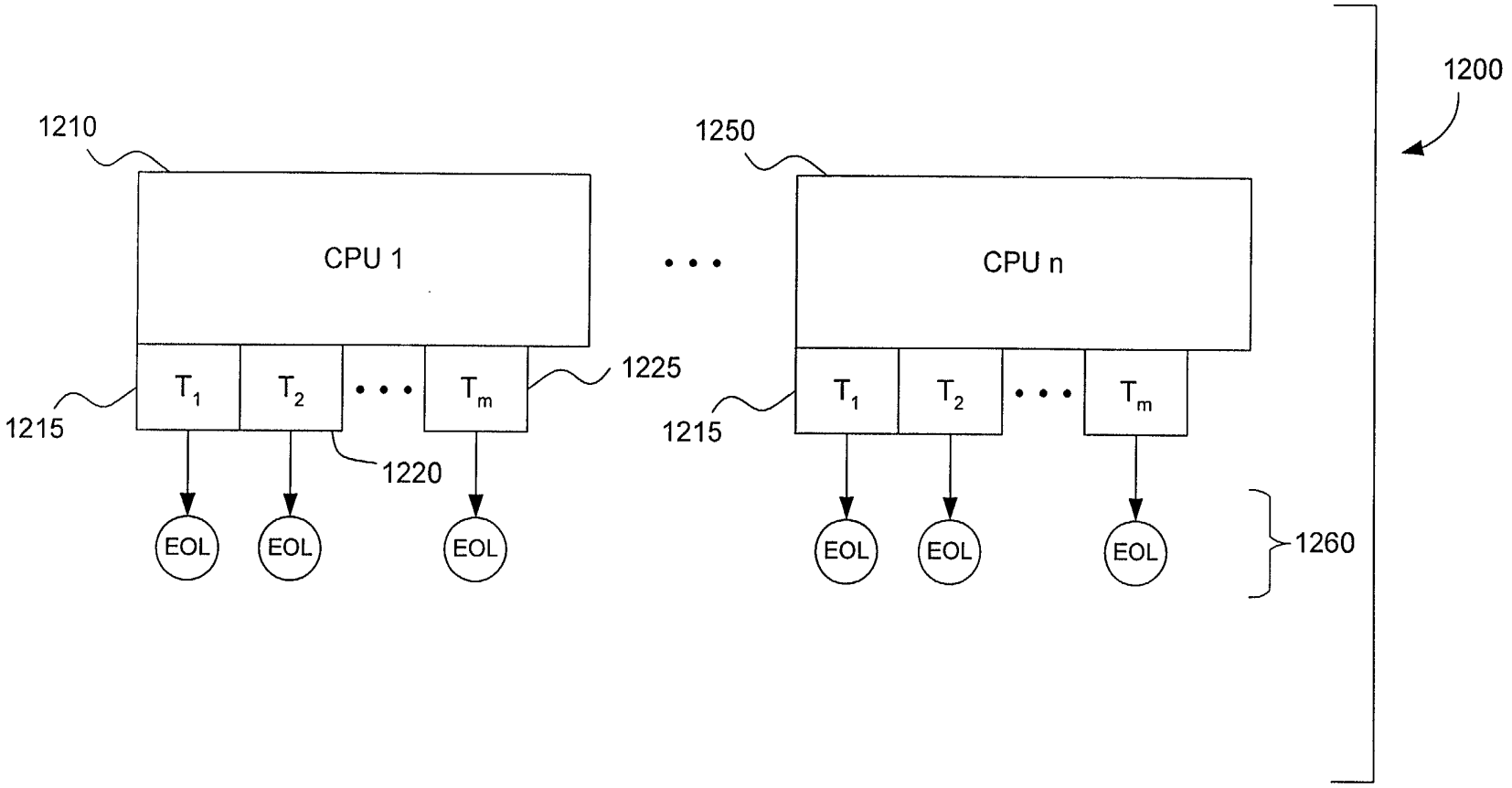

FIG. 12

1300

FIG. 13

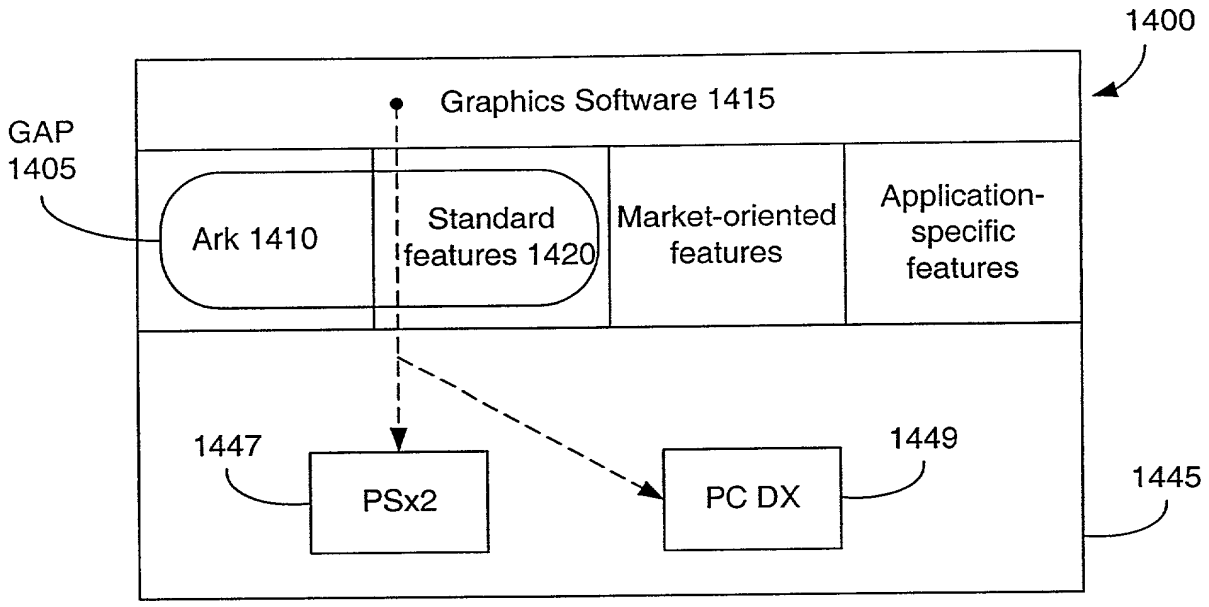

FIG. 14A

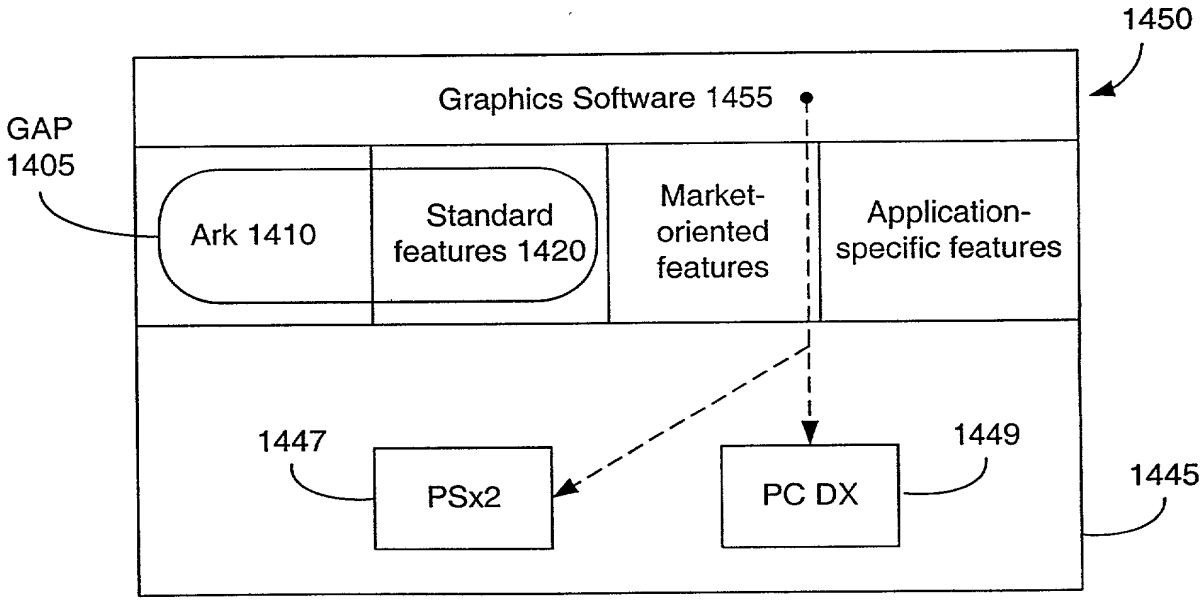

FIG. 14B

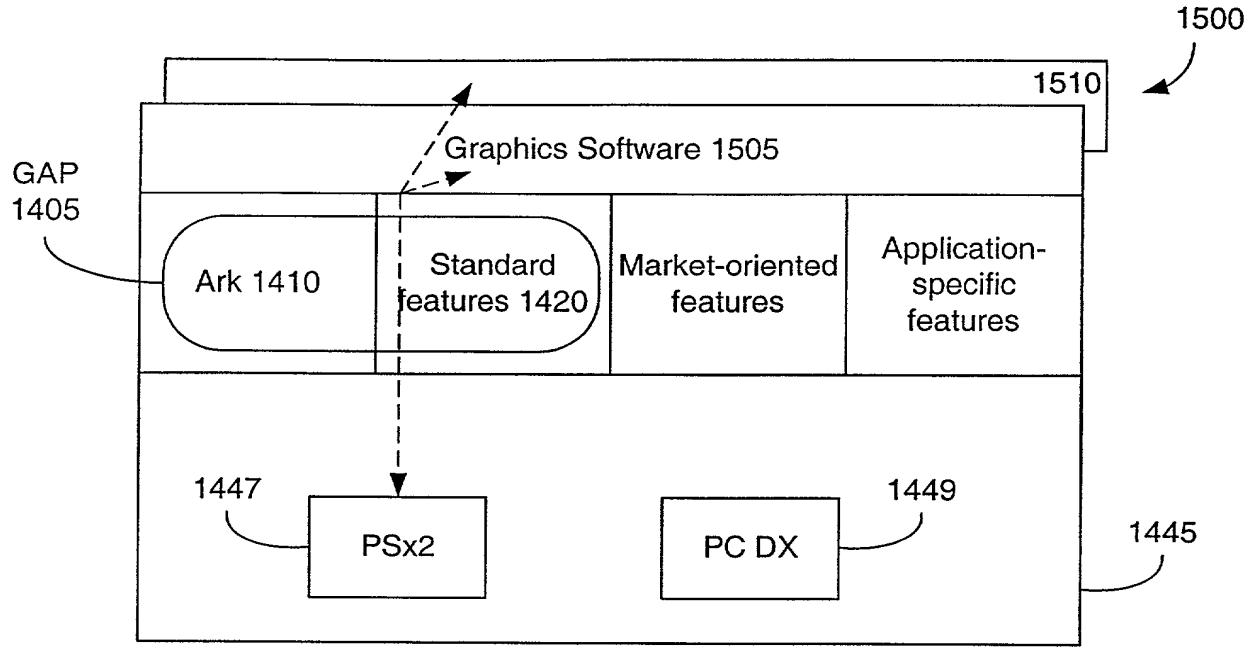

FIG. 15A

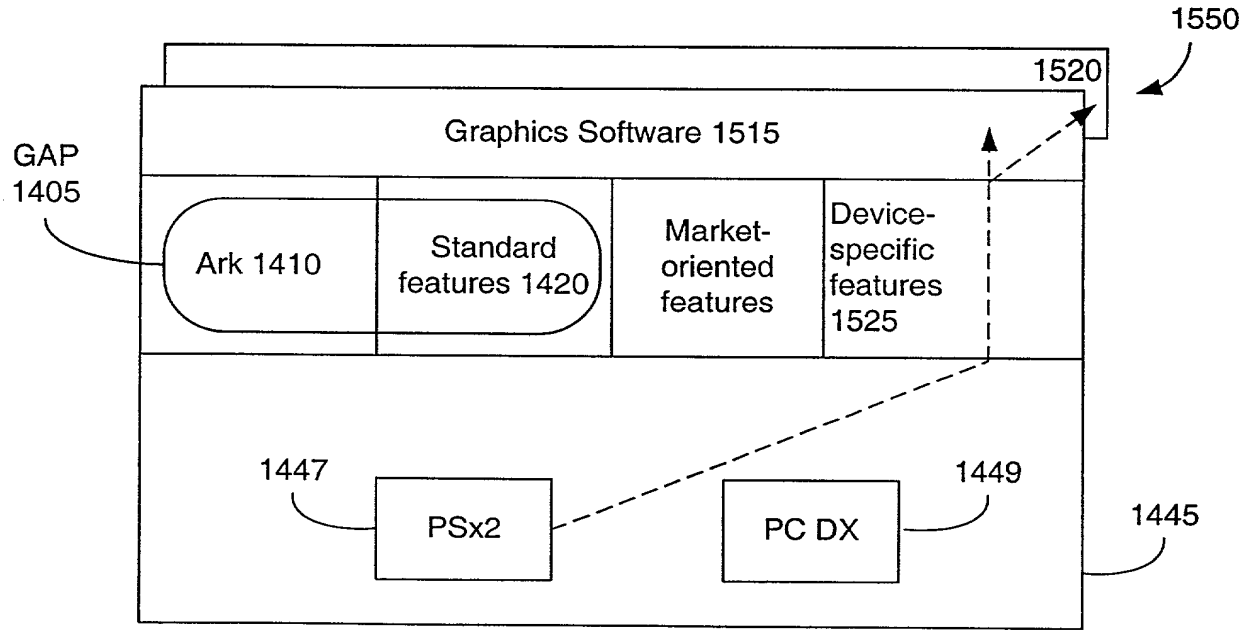

FIG. 15B

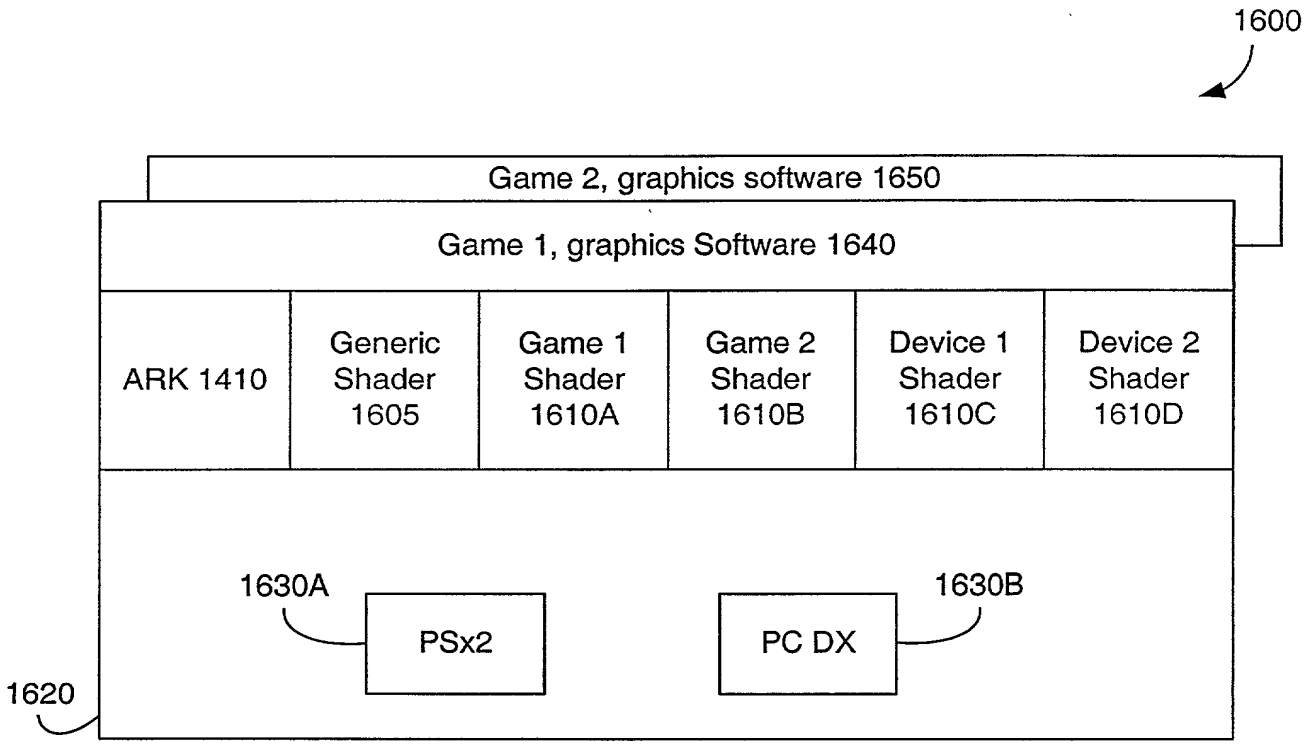
1600
Game 2, graphics software 1650
Game 1, graphics Software 1640
ARK 1410
Generic Shader 1605
Game 1 Shader 1610A
Game 2 Shader 1610B
Device 1 Shader 1610C
Device 2 Shader 1610D
1630A
PSx2
1630B
PC DX
1620

FIG. 16

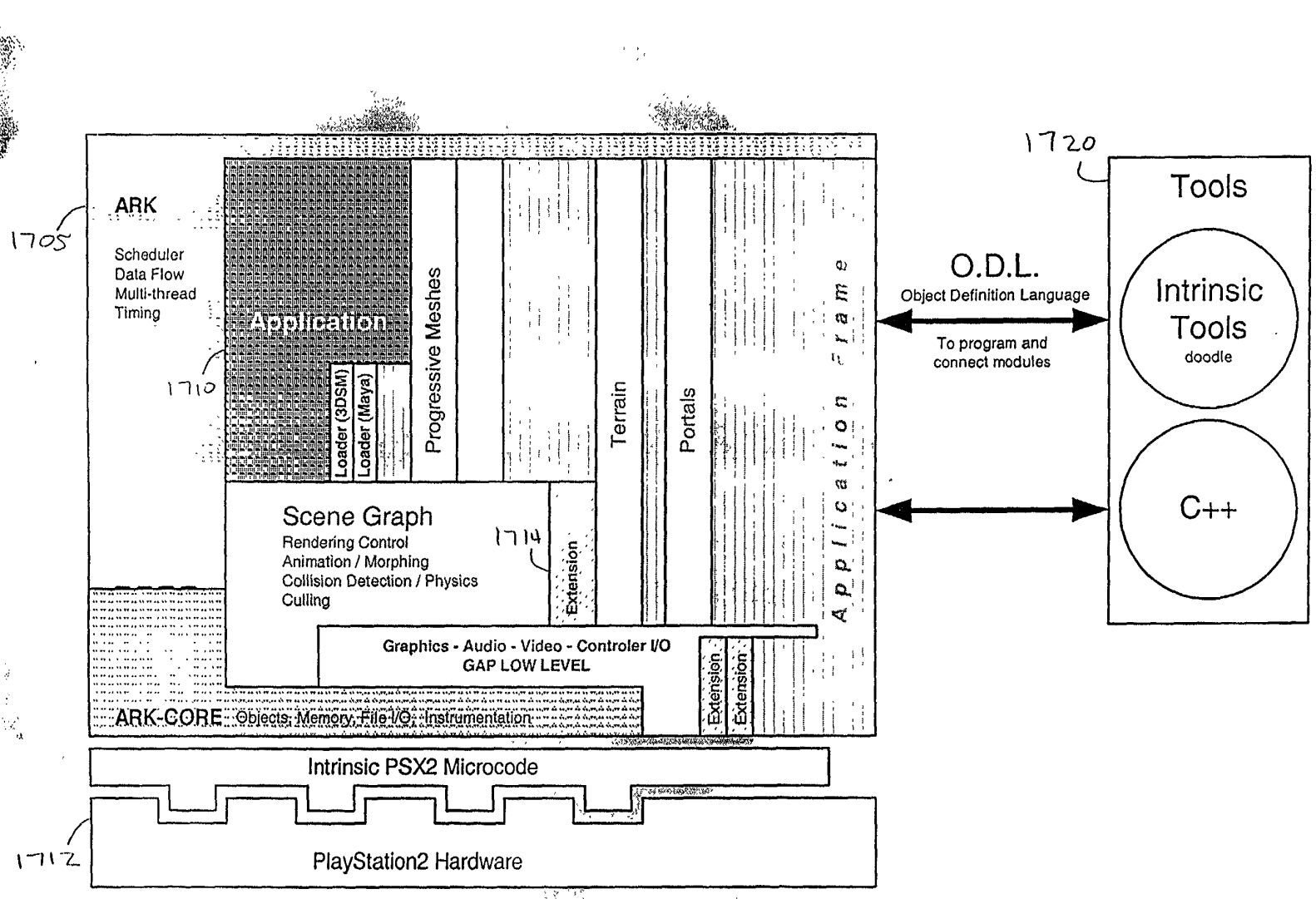
1700
1720
Tools
Intrinsic Tools
doodle
C++
O.D.L.
Object Definition Language
To program and connect modules
1705
ARK
Scheduler
Data Flow
Multi-thread
Timing
Application
1710
Loader (3DSM)
Loader (Maya)
Progressive Meshes
Terrain
Portals
Application Frame
Scene Graph
Rendering Control
Animation / Morphing
Collision Detection / Physics
Culling
1714
Extension
Graphics - Audio - Video - Controler I/O
GAP LOW LEVEL
Extension
Extension
ARK-CORE Objects, Memory, File I/O, Instrumentation
Intrinsic PSX2 Microcode
1712
PlayStation2 Hardware

FIG. 17A

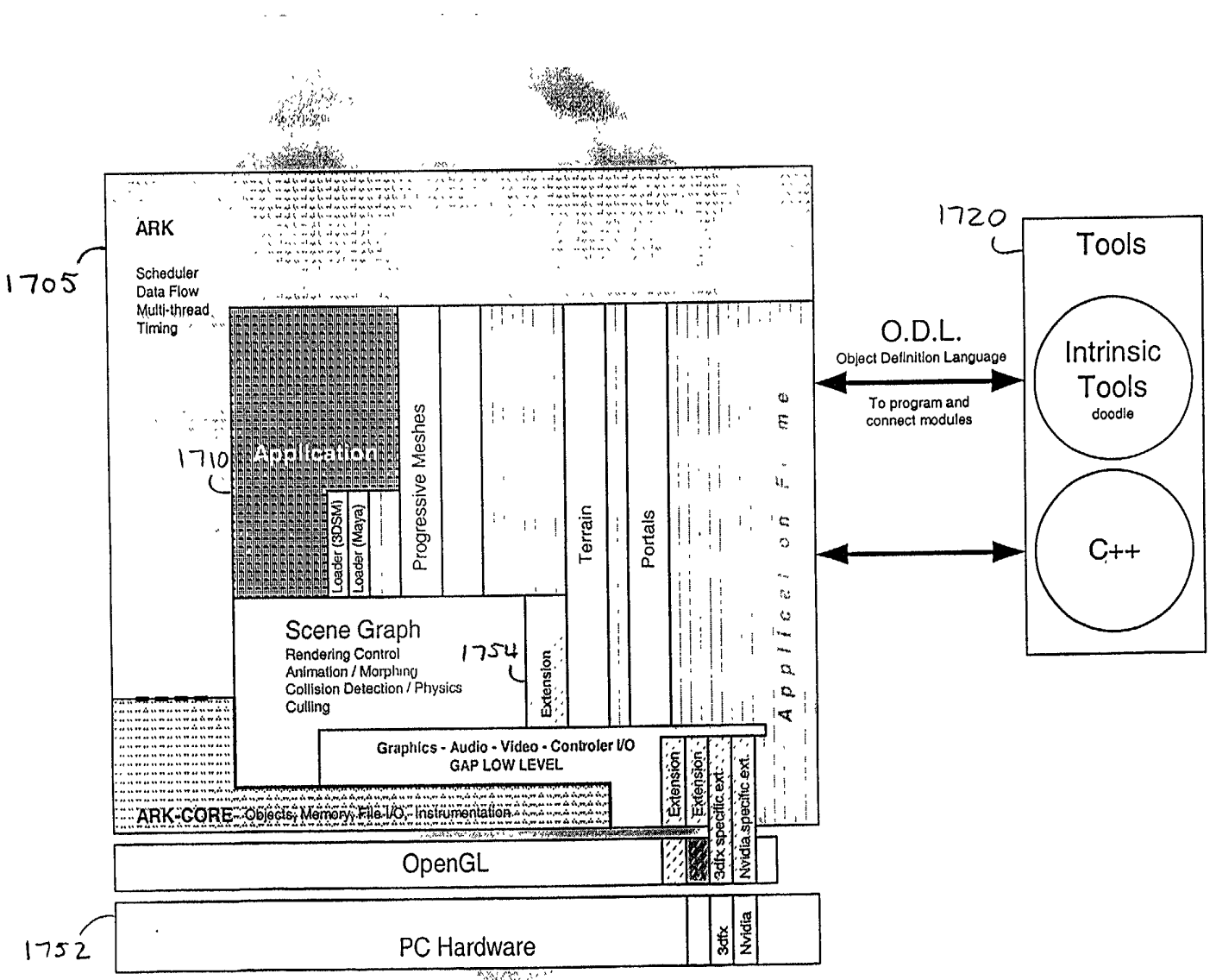
1750
1705
ARK
Scheduler
Data Flow
Multi-thread
Timing
1710
Application
Loader (3DSM)
Loader (Maya)
Progressive Meshes
Terrain
Portals
Application
Scene Graph
Rendering Control
Animation / Morphing
Collision Detection / Physics
Culling
1754
Extension
Graphics - Audio - Video - Controler I/O
GAP LOW LEVEL
ARK-CORE - Objects, Memory, File I/O, Instrumentation
Extension
Extension
3dfx specific ext.
Nvidia specific ext.
OpenGL
1752
PC Hardware
3dfx
Nvidia
1720
Tools
O.D.L.
Object Definition Language
To program and
connect modules
Intrinsic
Tools
doodle
C++

FIG. 17B

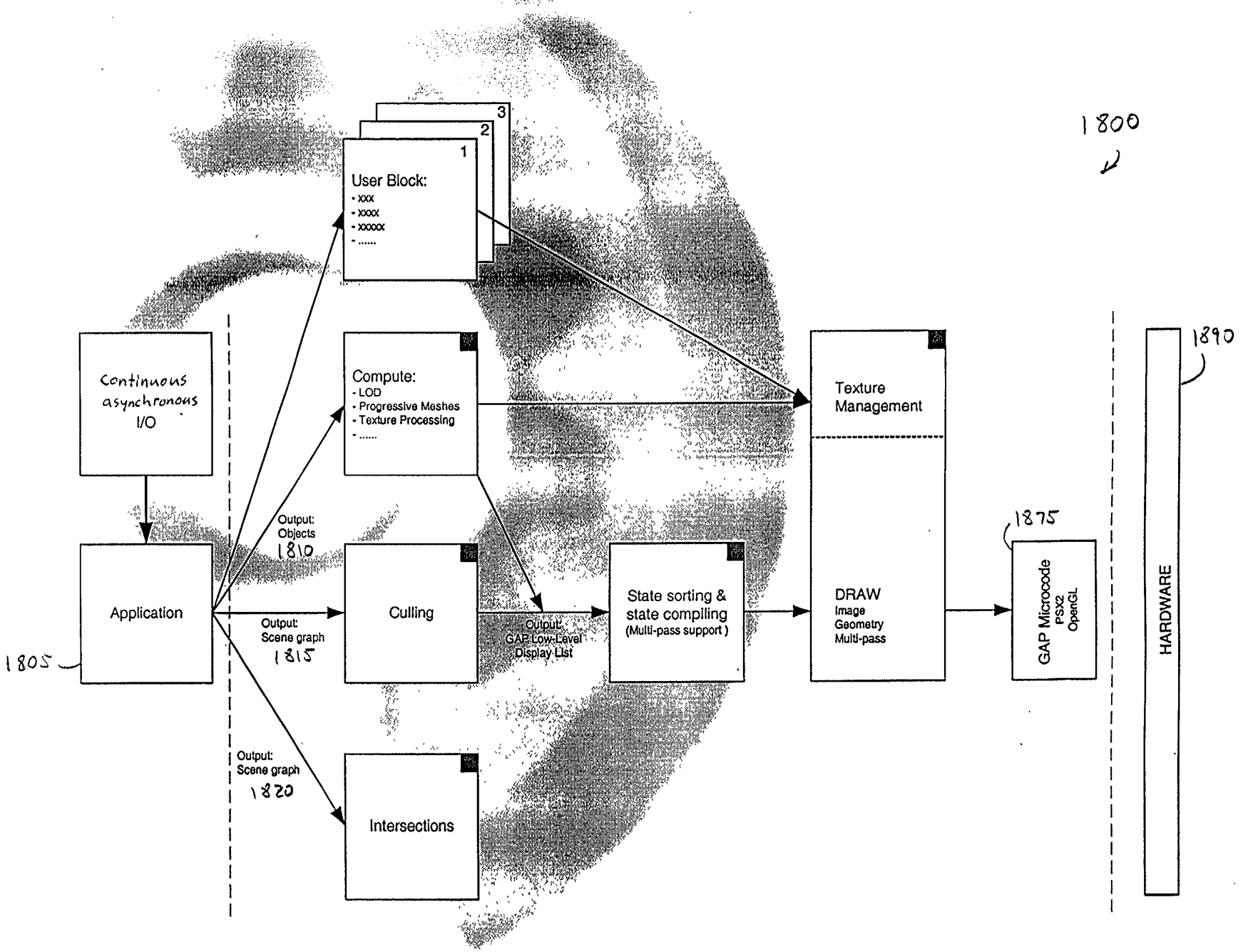
1800
User Block:
- xxx
- xxxx
- xxxxx
- .....
Continuous asynchronous I/O
Compute:
- LOD
- Progressive Meshes
- Texture Processing
- .....
Texture Management
Output: Objects 1810
Application
1805
Culling
Output: Scene graph 1815
Output: GAP Low-Level Display List
State sorting & state compiling (Multi-pass support)
DRAW
Image
Geometry
Multi-pass
1875
GAP Microcode PSX2 OpenGL
HARDWARE
1890
Output: Scene graph 1820
Intersections

FIG. 18

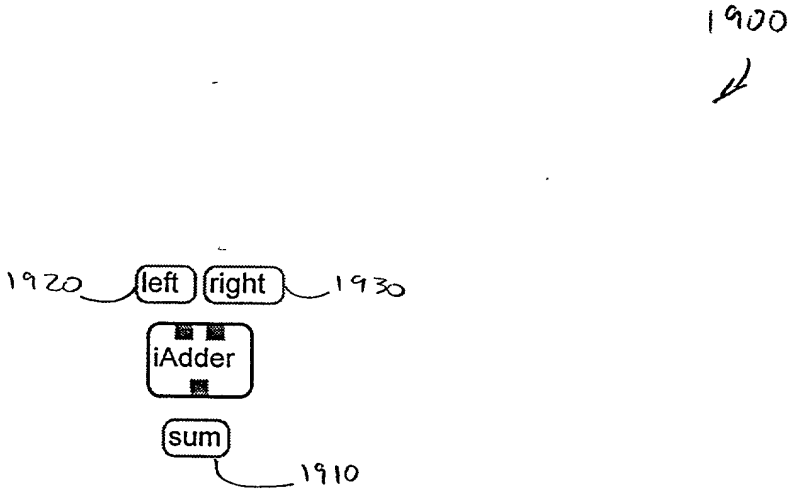

FIG. 19

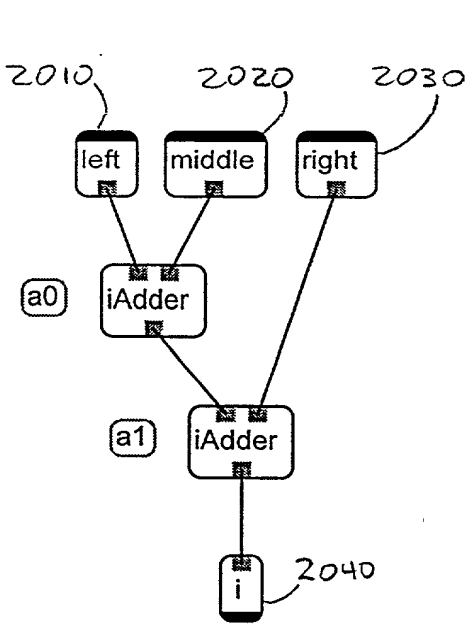
2000
2010
2020
2030
left
middle
right
a0
iAdder
a1
iAdder
i
2040

FIG. 20

2100

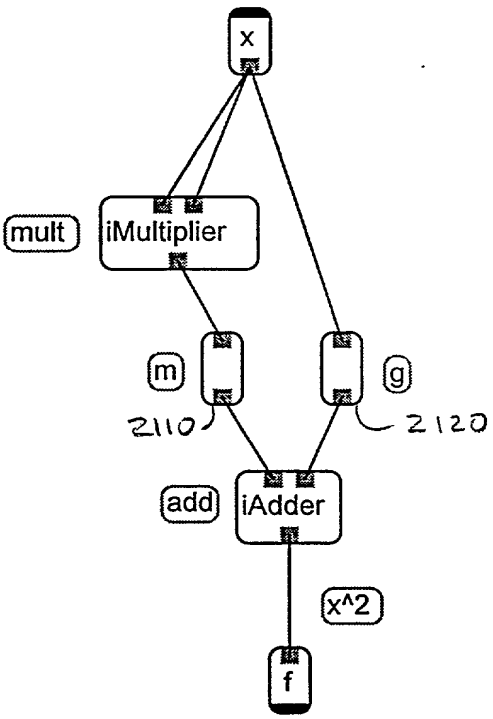

FIG. 21

2200

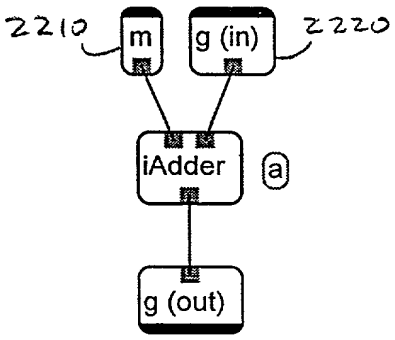

FIG. 22

2300

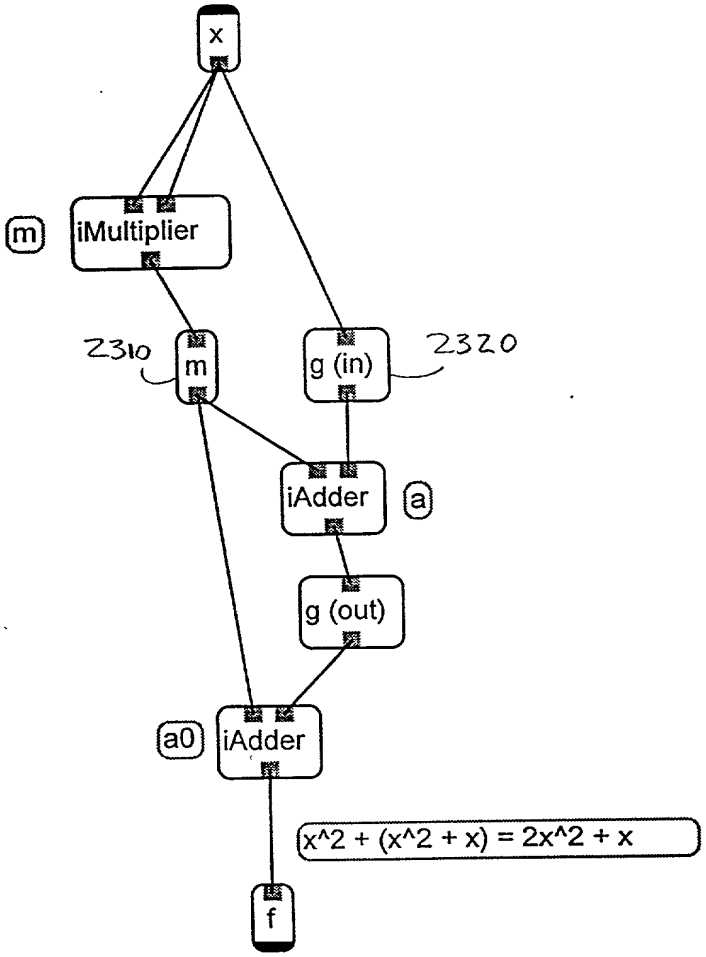
x
m
iMultiplier
2310
m
g (in)
2320
iAdder
a
g (out)
a0
iAdder
x^2 + (x^2 + x) = 2x^2 + x
f

FIG. 23